

What is claimed:

- 1 1. A method for preparing a native, cell-free tissue replacement comprising the steps of:
 - 2 soaking the tissue replacement for at least six hours in a solution comprising one or more
 - 3 sulfobetaines;
 - 4 washing the tissue replacement in one or more solutions of a buffered salt;
 - 5 extracting the tissue replacement in a mixture of one or more sulfobetaines with an anionic
 - 6 surface-active detergent; and
 - 7 washing the tissue replacement in one or more solutions of a buffered salt to remove the
 - 8 excess anionic surface-active detergent.
- 1 2. The method of claim 1, wherein the tissue replacement further comprises the step of
- 2 storing in a buffered salt solution until needed.
- 1 3. The method of claim 1, wherein the sulfobetaines have hydrophilic tails of 10 to 16
- 2 carbons.
- 1 4. The method of claim 1, further comprising the step of:
 - 2 adhering one or more components to the tissue replacement before storing, wherein the
 - 3 components are selected from the group consisting of a cell, a polymer, a bioactive agent,
 - 4 and combinations thereof.
- 1 5. The method of claim 4, wherein the cell is selected from the group consisting of bone,
- 2 cartilage, dermal, muscular, thyroidal, parathyroidal, lymphoid, pancreatic, urinary,
- 3 digestive, hepatic, biliary, vascular, nervous, reproductive and combinations thereof.
- 1 6. The method of claim 4, wherein the cells are obtained from a donor, a host, from cell
- 2 culture from a donor or a host, or cell cultures of established cells, tissue cells, or
- 3 transformed cell lines.

1 7. The method of claim 4, wherein the bioactive compound is selected from the group
2 consisting of a drug, protein, peptide, polysaccharide, fatty acid, nucleic acid,
3 oligonucleotide, detectable agent, organic molecules, inorganic molecules or salts and
4 combinations thereof that include natural or synthetic analogs, derivatives, or mimetic
5 versions of the bioactive compound for therapeutic, prophylactic and diagnostic purposes.

1 8. The method of claim 4, wherein the polymer is selected from the group consisting of
2 naturally occurring, synthetically-derived, covalently crosslinkable, ionically crosslinkable,
3 hydrophilic, and combinations thereof.

1 9. The method of claim 1, wherein the tissue replacement is further modified into a
2 structure selected from the group consisting of a suture, tube, sheet, film, scaffold, valve,
3 limb replacement, tissue transplant, and joint for delivery into the body.

1 10. The method of claim 1, wherein the sulfobetaine comprises SB-16.

1 11. The method of claim 1, wherein the anionic surface-active detergent comprises Triton
2 X-200.

1 12. The method of claim 1, wherein the step of washing the tissue replacement comprises
2 serial solutions of a buffered salt comprises three serial washes of 100 mM sodium and 50
3 mM phosphate for about 15 minutes each.

1 13. The method of claim 1, wherein the tissue replacement is harvested from mammalian
2 cadaver.

1 14. The method of claim 13, wherein the tissue replacement is cleaned of fat and blood
2 after harvesting and rinsed for several hours in deionized distilled water.

1 15. A native, cell-free tissue replacement made by the method of claim 1.

1 16. A kit for tissue replacement comprising a sterile cell-free native tissue replacement of
2 claim 15.

1 17. The kit of claim 16, wherein the tissue replacement comprises a suture, tube, sheet,
2 film, scaffold, valve, limb replacement, tissue transplant or a joint.

1 18. The kit of claim 17, wherein the tissue replacement further comprises a cell, a
2 polymer, a bioactive compound or combinations thereof.

1 19. The kit of claim 17, further comprising a sheet of instructions for use of the tissue
2 replacement.

1 20. A native tissue replacement obtained by the method comprising the steps of:
2 a cell-free tissue obtained from an organ of a mammal made by a process comprising:
3 soaking the replacement tissue in one or more sulfobetaine solutions for at least about 6
4 hours;
5 washing the tissue replacement in one or more solutions of a buffered salt to remove excess
6 detergent;
7 extracting the replacement tissue in a mixture of one or more solutions of Triton X-200/SB-
8 16 for at least about 6 hours; and
9 washing the tissue replacement in one or more solutions of the buffered salt to remove excess
10 Triton X-200/SB-16.

1 21. The tissue replacement of claim 20, wherein the tissue is selected from the group
2 consisting of bone, cartilage, dermal, muscular, thyroidal, parathyroidal, lymphoid,
3 pancreatic, urinary, digestive, hepatic, biliary, vascular, nervous, reproductive and
4 combinations thereof.

1 22. The tissue replacement of claim 20, further comprising the step of adhering one or
2 more components to the tissue replacement before storing.

1 23. The tissue replacement of claim 22, further comprising a component selected from
2 the group consisting of a cell, a polymer, a bioactive compound or combinations thereof.

1 24. The tissue replacement of claim 20, further comprising one or more components
2 adhered to the tissue replacement, wherein the components are selected from the group
3 consisting of a cell, a polymer, a bioactive compound, and combinations thereof.

1 25. The tissue replacement of claim 20, wherein the tissue replacement is stored at low
2 temperatures until use.

1 26. The tissue replacement of claim 20, wherein the tissue replacement is made by the
2 method of claim 1.

1 27. The tissue replacement of claim 20, wherein the tissue replacement is delivered to the
2 body in the form of a structure selected from the group consisting of suture, tube, sheet, film,
3 scaffold, valve, limb replacement, tissue transplant, and joint.

1 28. The tissue replacement of claim 20, wherein the tissue replacement is further
2 modified into a structure selected from the group consisting of suture, tube, sheet, film,
3 scaffold, valve, and joint for delivery into the body.

1 29. The tissue replacement of claim 20, further comprising one or more cells placed in
2 the gap between prior to acellular graft implantation.

1 30. The tissue replacement of claim 29, wherein the one or more cells comprise Schwann
2 cells.

1 31. An optimized acellular graft that supports axonal regeneration, guides the axons
2 toward the distal nerve end and is immunologically tolerated.

1 32. The acellular graft of claim 31, wherein the graft comprises a nerve graft.

1 33. The acellular graft of claim 31, further comprising the step of adhering one or more
2 components to the graft before storing.

1 34. The acellular graft of claim 31, further comprising a component selected from the
2 group consisting of a cell, a polymer, a bioactive compound or combinations thereof.

- 1 35. The acellular graft of claim 31, wherein the graft is stored at about 4 degrees
- 2 centigrade in a sterile, buffered solution until use.
- 1 36. The acellular graft of claim 31, wherein the graft is made by the method of claim 1.
- 1 37. The acellular graft of claim 31, wherein the graft is delivered to the body in the form
- 2 of a structure selected from the group consisting of suture, tube, sheet, film, scaffold, valve,
- 3 limb replacement, tissue transplant, and joint.
- 1 38. The acellular graft of claim 31, wherein the graft is further modified into a structure
- 2 selected from the group consisting of suture, tube, sheet, film, scaffold, valve, and joint for
- 3 delivery into the body.
- 1 39. The acellular graft of claim 31, further comprising one or more cells placed in the gap
- 2 between prior to graft implantation.
- 1 40. The acellular graft of claim 31, wherein the graft causes a reduced T-cell mediated
- 2 immune response.